Nathaniel Nauman

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Education

PURDUE UNIVERSITY
MS in Electrical Engineering
May 2023 | West Lafayette, IN

PURDUE UNIVERSITY
BS Honors in Comp. Engineering
Dec 2022 | West Lafayette, IN

AIIS KOLKATA
Bengali (Bangla) Language
Aug 2023 | Kolkata, India

QALAM WA LAWH
Classical and Modern Arabic
Aug 2019 | Rabat, Morocco

Skills

PROGRAMMING
C • Python • MIPS, ARM Assembly
Verilog • KLayout • Cadence

LANGUAGES
English (Native) • Conversational in
French, Arabic, and Bengali

Projects

DEVICE FABRICATION
Aug 2022 – Dec 2022
Used ALD, lithography, and wet etching to
fabricate MEMS cantilevers in Purdue's
Birck Nanotechnology Center cleanroom

MULTI-CORE PROCESSOR
Aug 2021 – Dec 2021
Built a pipelined multi-core processor with
cache coherency on FPGA and wrote
dual-thread code in assembly. Compared
with and without caches to find an 84%
increase in instruction rate (MIPS)

FPGA USB TRANSMITTER
Jan 2021 – May 2021
Led a team of 3 to build a USB and data
buffer on FPGA and taught others how to
implement cyclical error-checking

INNOVATION COMPETITION
Sep 2020-2021
Winner of $20,000 award in Soybean
Product Innovation Competition for soy
hydrolysate research under Distinguished
Prof. Michael Ladisch and presented to
the Indiana State Senate at their Industry
Affairs committee

Research

LIGHTWAVE RESEARCH LABORATORY | Columbia University
Aug 2023 – Pres | Supv: Charles Batchelor Prof. Keren Bergman
- Graduate student with interests in photonic IC design and quantum optics

PROFESSOR DATTA'S LABORATORY | Purdue University
May 2021 - May 2023 | Supv: Thomas Duncan Dist. Prof. Supriyo Datta
- Created probabilistic-bit accelerator to perform numerical analysis on systems modeled by strongly nonlinear stochastic differential equations

QUANTUM SEMICONDUCTOR SYSTEMS | Purdue University
May 2022 - Mar 2023 | Supv: Bill & Dee O'Brian Dist. Prof. Michael Manfra
- Built dilution refrigerator sample carrier for fractional quantum Hall effect data

FAULT-TOLERANT COMP. SYST. DESIGN | Purdue University
Jan 2022 - Jun 2022 | Supv: Prof. Saurabh Bagchi
- Led a small team to offload analytics onto programmable switches by developing filter hardware; then I presented at the 2022 intl. DSN conference

LAB OF RENEWABLE RESOURCES ENGR. | Research Assistant
Sep 2019 – Apr 2021 | Supv: Distinguished Prof. Michael Ladisch
- Experimented on proteases in enzymatic hydrolysis for new soy biostimulant

May 2018 – Aug 2018 | Supv: Distinguished Prof. Michael Ladisch
- Used high-performance liquid chromatography to analyze proteins for Eli Lilly

Leadership Experience

INVERSE KINEMATICS ARM | Senior Design Team Leader
Jul 2021 – Dec 2021 | Embedded Systems Design Team
As team leader, my team and I built a smart hexapod leg that finds the optimal path to any coordinate. We achieved 3:1 force multiplication with our revolutionary new elbow joint designs by developing pulley-cabling linkages based on tendons

PURDUE SOLAR RACING | Electrical Lead & VP of Operations
Aug 2018 – May 2022 | Solar-Powered Car Student Organization
Organized workshops for designing the motor controller and battery management

Awards

2023	NSF Graduate Research Fellowship and State Department CLS recipient
2022	ECE Undergraduate Excellence Award Honorable Mention
2021	Winner of $20,000 Student Soybean Product Innovation Competition
2019	Purdue Trustees Scholarship and two CFGL scholarships
2019	Full Scholarship from Nat'l. Security Language Initiative for Youth
2017	Awarded top 35 high-school poets in U.S. by Nat'l. Student Poets Assoc.

Publications and Posters

[1] N. Nauman, J. Kaiser, and S. Datta. P-bit and FPGA acceleration of sampling for modeling log-normal colored noise in nonlinear oscillator. *Poster presented at: The Elmore ECE Emerging Frontiers Center on the Crossroads of Quantum and AI*, 2022.

[2] N. Nauman, R. Wu, and S. Bagchi. Real-time digital filtering for IoT data in programmable network switches. *52nd Annual IEEE/IFIP International Conference on Dependable Systems and Networks - Supplemental Volume (DSN-S)*, 2022.